



## DEPARTMENT OF THE AIR FORCE

WASHINGTON D C 20330

OFFICE OF THE SECRETARY

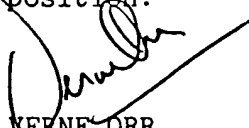
JUL 5 1983

## MEMORANDUM FOR DEFENSE SPACE OPERATIONS COMMITTEE (DSOC) PRINCIPAL MEMBERS

SUBJECT: Finalize DOD Position on a Manned National Space Station

On May 27, 1983, the DSOC met and approved an "interim" DOD position on the military utility of a space station to be transmitted to the Senior Interagency Group (SIG) - Space process. The position was "interim" because the Air Force Scientific Advisory Board (SAB) had not completed its study on this subject.

The SAB has since completed its study and the report should be published in the near future. Its conclusions (Attachment 1) are consistent with the efforts briefed at the May 27 DSOC meeting. Therefore, I recommend adopting the interim DOD response (Attachment 2) that was transmitted to Mr. McFarlane as the final DOD response and that the Secretary of Defense be notified of our final recommended position. Request your coordination below if you concur with this position.

  
VERNE ORR  
Chairman, DSOC

## 2 Attachments

1. SAB Conclusions
2. Interim DOD Position

USD (P) \_\_\_\_\_

USDRE

RSC Surv. PDD

JUL 13 1983

PDASN(RE&amp;S) \_\_\_\_\_

WASHINGTON DC 20500

20 JUN 1983

In Reply Refer To  
I-05018/83

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Mr. Robert C. McFarlane  
Deputy Assistant to the President  
for National Security Affairs  
The White House  
Washington, DC 20500

Dear Bud:

As you know, the Department of Defense (DoD) has been studying the question of requirements for a manned space station. The attachment to this letter provides a summary of these efforts and associated findings. A synopsis of these activities and findings was recently presented to the Defense Space Operations Committee and adopted as the current DoD statement on space station requirements for use in responding to NSSD 5-83.

While the study effort was led by the Air Force, the other Services participated to ensure a Defense-wide perspective. The objective of the DoD review was to determine if there was a set of DoD mission requirements that could be uniquely satisfied by a manned space station. The study was to determine if a body of DoD mission requirements exist that could be significantly enhanced or supplemented by a manned space station.

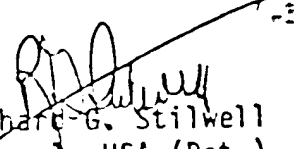
The study concluded that at this time there are no currently identifiable mission requirements which could be uniquely satisfied by a manned space station. Further, no current requirements were found where a manned space station would provide a significant improvement over alternative methods of performing the given task. Over time, however, this situation may change. Therefore, we are devoting considerable attention to developing a better understanding of potential future requirements for the military role of man in space. We also believe that significant additional information can be obtained by using Space Shuttle capabilities and by extending Space Shuttle flights. Research efforts to extend the Orbiter's ability to remain on-orbit, for instance, should be pursued in order to provide answers to these questions. Such a modified Orbiter could be used as an R&D platform leading to a better understanding of man's role in space.

New technology, such as an orbital transfer vehicle or a teleoperator maneuvering system, should also be examined to perform on-orbit operations. With this knowledge, a space station may have a role for DoD at some future time.

Independent of any program to develop a manned space station, the United States must ensure that a viable Space Shuttle system is available to meet national launch needs, including those of national security. This nation

most be done to ensure the Shuttle is able to fully utilize its designed capabilities and to ensure the operation of a Shuttle fleet that is adequate to meet national needs.

Should a national decision be made for NASA to develop a space station, the DoD would continue to consider the space station for use by military programs.

  
Richard G. Stilwell  
General, USA (Ret.)  
Deputy

Enclosure  
DoD Requirements Review for  
SIG(Space) Manned Space  
Station Study

cc  
Mr. John J. Hodge  
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MFA-13  
National Aeronautics and Space  
Administration  
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Department of Defense Requirements Review for SIG (Space)  
Manned Space Station Study

Introduction

DOD mission requirements are formulated in an interactive and dynamic environment that includes U.S. National Security and Foreign Policy, National Security objectives, threats to U.S. National Security, U.S. Defense strategy, and the prioritized military capabilities required to implement the U.S. National Security strategy. DOD space programs are a part of the military capabilities and are based on the foregoing. The DOD Space program is not simply a reaction to Soviet Space activities nor an end unto itself, but is the result of a continuing evaluation of alternatives for meeting National Security objectives. As with all methods of satisfying our National Security requirements, space systems receive funding to the extent that they demonstrate a competitive advantage over alternative means. The same is true among competing space solutions be they manned or unmanned.

For DOD to have a requirement for a manned space station, it must uniquely satisfy or at least significantly enhance one or more of the DOD space missions. Further, a space station must compete favorably either technically and/or economically with alternative methods for performing a given mission. The presence of a space station will not create new military missions, but could possibly provide a new means for accomplishing existing missions.

Finally, both civil and military communities must consider the cost and complexity of the sizable infrastructure that will be required to support any space-station activity. DOD will consider a manned space station as a potential solution in the context of overall military requirements.

Background

During the past 25 years of space operations, military space programs have grown from infancy to mature elements of United States military capability. During that time, DOD conducted two major programs in which man was integral to the system -- the Dyna Soar and the Manned Orbiting Laboratory (MOL). Competition for resources with the Apollo and Skylab programs as well as questions associated with the utility of military man in space contributed to the cancellations of both Dyna Soar and MOL late in their development cycles, and after large expenditures had been made. For the past year, DOD has again been examining military requirements in support of NASA's effort to begin development of a

manned space station. During this time, three major studies were undertaken to examine potential military requirements for a manned space station.

In August 1982, NASA allocated \$6M for eight contractors to perform requirement definition studies for a manned space station. DOD added \$300K to NASA's effort to expand the tasking to include national security needs. In determining these requirements, the contractors were encouraged to contact operational military commands in addition to the research and development agencies and Headquarters staffs. The contractors submitted their final study results to the Air Force in April 1983.

During the same time period, Headquarters USAF tasked Air Force Systems Command (AFSC) to perform an independent analysis of the military utility of a manned space station. An Ad Hoc study team at AFSC's Space Division discussed requirements with the operational commands, and their findings were briefed to the major Air Force commands involved in space as well as to Headquarters Air Force and the Air Force Secretariat in February 1983.

In January 1983, the Air Force Scientific Advisory Board (SAB) was tasked to provide another independent appraisal of the potential military utility of a manned space station. Since an assessment of military requirements for a space station extended beyond the Air Force, an Advisory Committee consisting of the Chairman of the Army Scientific Advisory Board and the Navy Research Advisory Committee was formed to review the findings. Preliminary indications are that the findings will not be significantly different from those of the other Air Force studies.

#### Findings and Recommendations

In April, the eight contractors provided assessments on the military needs for a manned space station. They identified potential space support missions in the areas of research, development, test, and evaluation (RDT&E); servicing/logistics; and depot storage of satellites as programs with possible military space station potential. The contractor studies were submitted to the Air Force's Space Division for assessment. The Space Division Ad Hoc Working Group evaluated the contractor identified concepts against valid military requirements and found that none uniquely required the use of a space station.

The Space Division Ad Hoc Group presented their findings in April 1983. These findings were consistent with the contractors' conclusions. There are no existing military requirements that could justify

development of a manned space station. Further, no projected requirements could be identified that would be significantly enhanced by the development of a space station.

With the possible exception of some military-related research and development, military operations on a manned space station do not appear, at this time, to offer the most efficient use of DOD resources. Studies to date have identified no unique, cost effective contributions that man-in-the-loop can make to the execution of military missions such as surveillance, navigation and communications. Further, considering the cost of developing and procuring one or more space stations and the difficulty in making a space station survivable, questions are raised concerning the reliance that could be placed on the availability of a space station in conflict.

In the interim, DOD believes additional space operational experience should be obtained to gain knowledge of man's capabilities in space as well as developing technologies to take advantage of his capabilities. During the 1960's and early 70's, NASA's manned space program gained considerable knowledge on man's utility in space. The Space Shuttle program was largely predicated on the fact that it would be manned and could use man in maintenance, repair, retrieval, etc.; many of the same missions for which a space station might be useful. Thus far, the Space Shuttle has been used as little more than a booster to place satellites on-orbit. On the other hand, experience gained in NASA's manned space program to date has not altered a view that most military space missions may better be performed by unmanned systems. Recent advances in technology have vastly increased our capability to couple space systems with high-speed computers, video links, satellite relays, and appropriate feedback mechanisms, to perform most missions in an effective and efficient manner.

Rather than DOD participation in the development of a major new space station program, it appears more beneficial in the near term for the DoD to utilize Shuttle missions to identify and evaluate the role of military man and to exploit the unique capabilities of the Space Transportation System (STS). If full advantage is to be taken of manned opportunities for DOD in STS operations, near term actions are required to ensure the availability of an appropriate technology base. Specifically, DOD should conduct a program to consider a course of action to implement projects to resolve the uncertainties associated with the utility of man in space. Candidates include:

- (1) As stated in the national space policy (NSDD-42) "The first priority of the STS program is to make the system fully operational and cost-effective in providing routine access to space." In consonance with this policy DOD should consider participating with

NASA in enhancing the capabilities of the Shuttle. Examples of candidate enhancements: (a) a power extension package (PEP) to increase the Orbiter mission duration; (b) a teleoperator maneuvering system (TMS) which would enhance the low earth-orbit delivery, service and retrieval of unmanned satellites and payloads, and, (c) other generic equipment such as hand tools, handling fixtures, etc., as required. These capabilities, in conjunction with the Shuttle, would enable DOD to pursue an evolutionary program capitalizing on the U.S. Government investment in the STS to gain first hand experience with manned military space operations.

(2) Dedicated DOD Space Test Program "spacelab type" Shuttle missions could be pursued as a demonstration of the value of military crews in space. The payloads/experiments to be flown on these missions could emphasize RDT&E experiments which might benefit significantly from manned interaction (demonstrating man's role in space based RDT&E) and those experiments that could help define the utility of military crews in performing operational military roles.

Such an evolutionary approach would better enable DOD to understand the potential role of military man in space and provide the necessary knowledge to make logical decisions pertaining to future manned space operations and capabilities.





REPORT OF THE  
SCIENTIFIC ADVISORY BOARD AD HOC COMMITTEE ON THE  
POTENTIAL MILITARY UTILITY OF A  
MANNED NATIONAL SPACE STATION

## INTRODUCTION

At the request of OSD, the Air Force, as executive agent, was asked to establish an Ad Hoc Committee on the Potential Military Utility of a Manned National Space Station (MNSS). Since all services of DOD have interests in the use of space in support of military missions, a somewhat unique organizational structure was established. The AF, through its Scientific Advisory Board (SAB), furnished the principal support, but the overall effort was subject to a three-service Steering Committee consisting of the Chairman of the SAB (AF), the Chairman of the Army Science Board, and the Chairman of NRAC (Navy). Representatives of all three services participated as working members of the Committee. The membership of the Committee is listed in Attachment A.

The complete charge to the Committee is Attachment B. Briefly stated, the Committee was asked to make "an independent appraisal of the potential military utility of a possible (manned) national space station" and "to assist in determining the appropriate level of AF/DOD participation and investment in the program."

In its discussions, the Committee necessarily reviewed the total use of space in support of military operations and, in particular, the role man-in-space can play in meeting military research and development and operational requirements. A number of separate working papers were prepared by members of the Committee, and these are included in Attachment C. These papers are not a part of the Committee report; they should be considered as inputs to the Committee. The Committee received numerous briefings from NASA, USAF, USN, USA, and various contractors.

Finally the Committee focused in on the principal charge to the Committee -- specifically to make recommendations on the appropriate level of DOD participation should NASA proceed with a National Manned Space Program as currently described. The NASA program is an evolutionary development leading toward a permanent manned-presence in space. Being evolutionary, it starts off with a single manned station with orbit characteristics: inclination 28.5°, altitude 200-300 miles; and an IOC of about 1991. It evolves over the next ten years to larger stations, orbital transfer vehicles (OTV), remote manipulators, multiple stations in other orbits, etc. The principal functions of the system, as stated by NASA, are: service center in space, assembly depot, science and technology laboratory in space, transportation node to higher energy orbits, permanent observatory(s) in space, communications and data processing node, and storage facility in space.

The conclusions of the Committee and its recommendations follow. These conclusions and recommendations constitute the report of the Committee.

### CONCLUSIONS

1. The principal value of a manned national space station (MNSS) to the Department of Defense is as a base for RDT&E (Research, Development, Test and Evaluation)\* needing extended (multi-month) time on orbit. The MNSS would provide longer times on orbit than the shuttle; and it may be a less expensive alternative for certain experiments than free flyers used in conjunction with the shuttle. The number and type of RDT&E programs that might use the MNSS during 1990-2010 have not yet been identified but the Military Space System Technology Model provides an initial basis for the needed identification.
2. Experience has shown that man in space is capable of making observations of phenomena not previously recognized from remotely sensed satellite data; though a retrospective look at the results of remotely sensed data often shows that those observations could have been derived from that data once the phenomenon is called to attention. To allow additional opportunities for observation by experienced professionals, and to allow more extended time for use of the shuttle in RDT&E applications, the DOD should also support extending the flight duration of the shuttle.
3. Preliminary NASA studies of the MNSS have suggested that it be used as a way station for satellites proceeding onward to geosynchronous earth orbits (GEO) and to the planets. Preliminary cost estimates, based on NASA contractor studies, may lead to greatly underestimated costs -- resulting in part from economic assumptions (mission model, support costs, consequences to satellite costs, OTV capture fraction, shuttle manifest load factor). The suggested transportation node concept looks undesirable for DOD missions (as compared to direct launch from the shuttle bay). Adding another node to the transportation of military satellites to GEO, including the routine use of man in EVA, requiring reusable OTVs that must be checked out and refurbished on orbit, requiring that the satellites spend extended times at the MNSS with minimal support in yet another environment, and further complicating the shuttle manifesting problems are some of the salient reasons for this conclusion.

\*The term RDT&E should be interpreted broadly -- including: conducting experiments relative to military operational functions; facilitating space systems development by providing laboratory and test base; collecting critical data (background radiation, etc.); conducting basic research in a space environment; and exploring the value of man in space, particularly the exploitation of expert observers.

4. A review of operational DOD missions in space has identified no military application that requires a manned space station. However, events and technology have changed the military roles and missions in the past and may do so again within the next decades. Some examples of potential new missions are: space-based ABM, weapons in space, space-based space surveillance, space-based ocean surveillance. Some of these are complex and are today not well understood. These potential missions justify DOD participating in the MNSS as a user interested in exploiting technical opportunities and in minimizing technological surprise.

5. Much of the presently recognized RDT&E value of a MNSS to the DOD can be realized by a MNSS in the NASA proposed 28.5° inclination, 200-300 nmi, 3-6 man station. It is premature to consider a separate DOD MSS or a MNSS in other orbits.

#### RECOMMENDATIONS

1. The Committee recommends that DOD (USAF) continue to participate with NASA during NASA's planned three-year requirements definition effort (between now and the start of actual design work in 1987); but that further DOD participation be subject to a DOD review at the highest level.

2. The Committee recommends that, should a decision be made to proceed with a MNSS, the DOD assume the role of a user of the station for purposes of RDT&E.

3. The Committee recommends that DOD sponsor more detailed studies on the military value of a MNSS, including:

a. Identification of specific RDT&E to be done on the MNSS during the period 1995-2005, complete enough to help determine the needed MNSS support (size, mass, communications, accessibility, safety, crew size and rotation, jigs and fixture, interfaces, etc.). A reasonable estimate should be made of the number of such RDT&E support activities per year and how some might be handled simultaneously.

b. Analysis of the sensitivity of the MNSS study conclusions to the mission model; e.g., the effects of much reduced traffic through the station to GEO and the planets on the "cost effectiveness" of the MNSS.

c. Continue DOD studies of possible military utility of follow-on military dedicated manned station across the full spectrum of anticipated military activities under various threat environments ranging from peacetime through crisis management, third-world conflicts, to large-scale conventional warfare.

d. Assessment of the transportation node concept.

4. The Committee recommends that the DOD support extending the flight time of the shuttle in order to improve its capabilities as a space laboratory and to simulate some of the laboratory advantages of the MNSS.

ATCH 2